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U.S. FOREST SERVICE - U. S. DEPARTMENT OF AGRICULTURE

**PACIFIC SOUTHWEST
FOREST AND RANGE
EXPERIMENT STATION
BERKELEY - CALIFORNIA**

RESEARCH NOTE

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CALIFORNIA CONE CROP, 1959

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Only a few localities in California can expect a good crop of forest tree seed in 1959. In general, field reports indicate that the cone crop on commercial forest trees will be even lower this year than in 1958. Only 14 percent of the reports rated the potential crop as medium or heavier, compared to 23 percent last year. Even in the seed zones having good prospects, the crop will vary considerably in different parts and will generally be restricted to small areas. Heavy crops were indicated for ponderosa pine in zones I, II, and III; for Jeffrey pine in zones IV, V, and VI; for sugar pine in zones IV and V; for California red fir in zones V, VII, and VIII; for Douglas-fir in zones X, XI and XII; and for redwood in zone XII.

These are the main conclusions from a study of the cone-crop reports sent to the Pacific Southwest Forest and Range Experiment Station by members of the California Division of Forestry, the California Region of the U. S. Forest Service, the Southern California Edison Company, the Department of Forestry of Humboldt County, and members of the Experiment Station.

Most of the reports were based on ocular estimates in which the crop was rated as none, very light, light, medium, or heavy, according to the cone crop classification used in Oregon^{1/}. In this classification the cone crop ratings are:

1. None--no cones on any trees or few cones on occasional trees.

1/ Engstrom, W. H. Oregon cone crop, 1954. Oregon State Board of Forestry. Res. Note 16, 7 pp., 1954.

2. Very light--few cones on 25 percent of the trees, or few cones on 25 percent of the trees and many cones on occasional trees.
3. Light--few cones on 75 percent of the trees, or many cones on some trees and few cones on 75 percent of the trees.
4. Medium--some cones on all trees, or many cones on less than 75 percent of the trees.
5. Heavy--many cones on 75 percent of the trees and some cones on all trees, or many cones on all trees.

Although these ratings are subjective, they provide valuable information for those planning to collect seed this fall.

Several of the cone crops in seed zones IV and V were rated by the cone crop index devised by Fowells and Schubert. ^{2/} This index contains 5 classes of crops based on the average number of cones per tree larger than 19.5 inches in diameter:

Cone crop rating:	<u>Ponderosa pine</u>	<u>Sugar pine or white fir</u>
None	0	0
Light	1-20	1-10
Medium	21-80	11-40
Heavy	81-160	41-80
Very heavy	161 or more	81 or more

As an aid to seed collectors the crop reports have been segregated according to the forest tree seed collection zones described by Fowells. ^{3/} This grouping (table 1), shows that the most promising localities for collecting seed of major commercial conifers--those with medium to heavy cone crops--are as follows:

<u>Species</u>	<u>Seed zones</u>
Douglas-fir	II, X, XI, and XII
California red fir	V, VII, and VIII
White fir	XI
Lowland white fir	XI and XII
Jeffrey pine	I, IV, V, VI, and VIII
Knobcone pine	I and III
Ponderosa pine	I, II, III, and X
Sugar pine	III, IV, V, X, and XIII
Redwood	XI, XII, and XIII

^{2/} Fowells, H. A. and Schubert, G. H. Seed crops of forest trees in the pine region of California. U. S. Dept. Agr. Tech. Bull. 1150, 48 pp., illus., 1956.

^{3/} Fowells, H. A. Forest tree seed collection zones in California. U. S. Forest Serv. Calif. Forest and Range Expt. Sta. Forest Res. Note 51, 5 pp., illus. 1946.

Considerable activity of cone and seed insects has been observed this year in Douglas-fir, ponderosa pine, and sugar pine which will reduce the crop in many areas. Squirrels and birds can also be expected to reduce further the cone crop, particularly for the pines, because of the low level of other available food this year.

A map of the collection zones is appended to this note, but since the seed crop is spotty and varies widely in most zones, it is also advisable to consult field offices of the California Division of Forestry, Department of Forestry of Humboldt County, or the U. S. Forest Service to determine best areas to collect cones.

Table 1. --Summary of cone crops by species and seed zone, California, 1959

Species	Seed zone	Cone crop ^{1/}
<u>CEDAR:</u>		
Incense-cedar (<u>Libocedrus decurrens</u>)	VIII II, III, VII IV, V I IX, X	None None to very light None to light Very light Very light to light
<u>DOUGLAS-FIR:</u>		
Bigcone Douglas-fir (<u>Pseudotsuga macrocarpa</u>)	IX	Very light to light
Douglas-fir (<u>P. menziesii</u>)	III, IV XIII V II, X XI XII	None None to very light None to light None to medium None to heavy Very light to very heavy
<u>FIR:</u>		
Bristlecone fir (<u>Abies bracteata</u>)	XIII	None

^{1/} Reported by technicians of the California Division of Forestry, the California Region of the U. S. Forest Service, the Pacific Southwest Forest and Range Experiment Station, Department of Forestry of Humboldt County, and the Southern California Edison Company.

Species	Seed zone	Cone crop ^{1/}
California red fir (<u>A. magnifica</u>)	IV VII II I, III, X VIII V	None None to heavy Very light Very light to light Very light to heavy Very light to very heavy
Lowland white fir (<u>A. grandis</u>)	XIII XII XI	Very light Light to heavy Heavy
White fir (<u>A. concolor</u>)	VI, VII II, IX I, III, IV, V, VIII X XI	None None to very light None to light Very light to light Light to medium
<u>HEMLOCK:</u>		
Mountain hemlock (<u>Tsuga mertensiana</u>)	I, VII VIII V	None Very light Light
<u>JUNIPER:</u>		
Western juniper (<u>Juniperus occidentalis</u>)	VI VII I V VIII	None to very light None to light Very light to light Light to medium Light to heavy
<u>PINE:</u>		
Bishop pine (<u>Pinus muricata</u>)	XII XIII	Very light Medium
Coulter pine (<u>P. coulteri</u>)	IX XIII	Very light to light Light
Jeffrey pine (<u>P. jeffreyi</u>)	II III, IX V VII I, VIII IV, VI	None to very light None to light None to very heavy Very light to light Very light to medium Very light to heavy
Knobcone pine (<u>P. attenuata</u>)	X, XI I, III	Medium Heavy

Species	Seed zone	Cone crop ^{1/}
Lodgepole pine (<u>P. contorta</u>)	I III, V, VII, VIII XII XIII	None to very light None to light Very light Medium
Monterey pine (<u>P. radiata</u>)	XIII	Medium
Ponderosa pine (<u>P. ponderosa</u>)	VIII IX, XI IV, V X II, III XIII I	None None to very light None to light None to medium None to heavy Very light to light Very light to heavy
Singleleaf pine (<u>P. monophylla</u>)	VI VIII	Very light Very light to light
Sugar pine (<u>P. lambertiana</u>)	II III IV I, VIII, IX VII X, XIII XI V	None to light None to medium None to very heavy Very light Very light to light Very light to medium Light to medium Light to very heavy
Western white pine (<u>P. monticola</u>)	VI VII III I V VIII	None None to light Very light Light Light to medium Medium
White bark pine (<u>P. albicaulis</u>)	VIII	None

SEQUOIA:

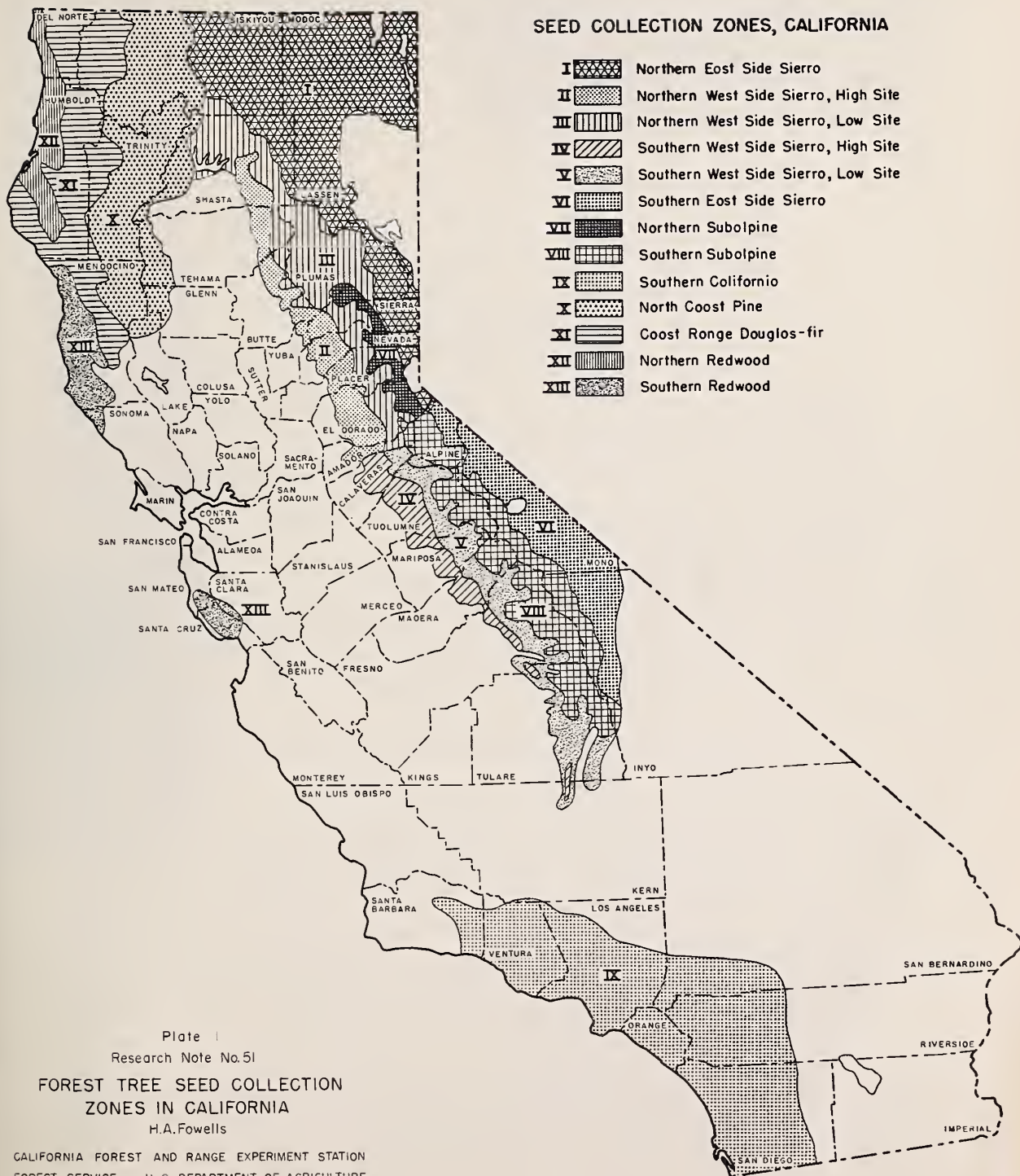
Giant sequoia (<u>Sequoia gigantea</u>)	V IV	Very light to light Medium
Redwood (<u>S. sempervirens</u>)	XIII XII XI	Very light to medium Very light to heavy Medium

Evaluation of 1958 Forecast:

Beginning with this report, a few notations will be made concerning the accuracy of the forecast for the preceding year in order to complete the record.

In general, the 1958 cone crop turned out about as predicted for most species and zones. The main exceptions were for Douglas-fir in zones X, XI, and XII (heavy losses due to insects); for ponderosa and Jeffrey pines in zones IV and V (losses due to squirrels and insects); and for sugar pine in zones II, III, IV, and V (losses due to squirrels and insects).

I		Northern East Side Sierró
II		Northern West Side Sierró, High Site
III		Northern West Side Sierró, Low Site
IV		Southern West Side Sierró, High Site
V		Southern West Side Sierró, Low Site
VI		Southern East Side Sierró
VII		Northern Subalpine
VIII		Southern Subalpine
IX		Southern Californio
X		North Coast Pine
XI		Coast Range Douglas-fir
XII		Northern Redwood
XIII		Southern Redwood

Plate I
Research Note No.51

FOREST TREE SEED COLLECTION ZONES IN CALIFORNIA

H.A.Fowells

CALIFORNIA FOREST AND RANGE EXPERIMENT STATION
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